Top Quark Mass average

- A very brief report because of all the work was already done for the previous average: FERMILAB-TM-2084.
- The new Run I l+jets ME mass measurement* is put to substitute the Run I templates l+jets mass.
- A new DØ top quark mass average is extracted.

*PRL draft under final review by EB 141. Sys errors are slightly smaller than what reported in Juan's Wine&Cheese talk

Method

$$\rho_i^{ab} = \frac{\langle \delta_i^a \delta_i^b \rangle}{\sqrt{\langle (\delta_i^a)^2 \rangle \langle (\delta_i^b)^2 \rangle}}$$

$$\rho^{ab} = \frac{\sum_{i=1}^{N} \rho_i^{ab} y_i^a y_i^b}{\sigma^a \sigma^b}$$

$$\mathcal{S}^{ab} = \rho^{ab} \sigma^a \sigma^b$$

$$\langle Q \rangle = \frac{\sum_{a,b=1}^{R} Q^a (\mathcal{S}^{-1})^{ab}}{\sum_{a,b=1}^{R} (\mathcal{S}^{-1})^{ab}}$$

$$\sigma_{\langle Q \rangle} = \frac{1}{\sqrt{\sum_{a,b=1}^{R} (\mathcal{S}^{-1})^{ab}}}$$

The CDF/DØ Top Averaging Group uses these equations to combine $R=5$ inputs $Q^{a,b} (1 \leq a, b \leq R)$ having N error sources $(1 \leq i \leq N)$. Here the δ_i's are excursions, the ρ's are correlations, the $y_i^{a,b}$'s are systematic errors, the $\sigma^{a,b}$'s are total errors, and $\mathcal{S}$ is the covariance matrix. The results are $\langle Q \rangle$ and $\sigma_{\langle Q \rangle}$.

Results

Old l+jets mass measurement: 173.3 ± 5.6(stat.) ± 5.5(sys.) GeV

New l+jets mass measurement: 180.1 ± 3.6(stat.) ± 3.9(sys.) GeV

Old DØ top mass average: 172.1 ± 5.2(stat.) ± 4.9(sys.) GeV

New DØ top mass average: 178.9 ± 3.5(stat.) ± 3.8(sys.) GeV